

Amendments to the Drawings

The attached sheet of drawings includes changes to Figure 3. This sheet replaces the prior submitted Figure 3 drawing. In Figure 3, Numerals 12a, 14a, 16a, 18a, 20a, and 22a have been amended to Numerals 12, 14, 16, 18, 20, and 22.

Attachment: Replacement Sheet
 Annotated Sheet Showing Changes

Remarks

The Applicants and the Applicants' undersigned attorney of record appreciate the Examiner's detailed and quite rigorous review and analysis of the application and claims presented. In light of the Examiner's Office Action, mailed April 4, 2007, Applicants herein amend the claims 46, 50-53, 55, 57, 60-62. Applicants urge the Examiner to examine these newly amended claims with the same level of detail and scrutiny and thereafter pass the currently amended claims to an expedient issuance. Each of the Examiner's objections and rejections are discussed in detail herein below.

Objections to the Drawings

In the Office Action dated April 4, 2007, the drawings were objected to for inconsistency. Applicants herein amend Figure 3 to correct for inconsistencies. Specifically, Numerals 12a, 14a, 16a, 18a....etc have been amended to Numerals 12, 14, 16, 18...etc. In view thereof, Applicants request Figure 3 be added to the current drawings.

Claim Rejection – 35 USC § 112

In the Office Action dated April 4, 2004, claim 46 was rejected under 35 U.S.C. 112 as failing to comply with the written description requirement.

Applicant appreciates the Examiner calling attention to a typographical error within the claim. As such, claim 46 has been amended to recite, "...a flowable conductive material extending over the ~~first surface~~ sidewall".

In view thereof, Applicants respectfully request the rejection to claim 46 be withdrawn.

Claim Rejections – 35 USC § 102(b) - Mizumoto

In the Office Action dated April 4, 2004, claims 46-62 were rejected under 35 U.S.C. 102(b) as anticipated by Mizumoto (U.S. Patent No. 5,662,987). Independent claims 46, 50, and 53 have been amended to better define Applicants' inventive concepts. For the reasons set forth below, it is Applicants' position that the Mizumoto reference does not anticipate independent claims 46, 50, and 53 as amended and thus, each of the claims that depend therefrom.

Claims 46, 50, and 53 were each amended to specifically characterize the "blind via" as "an unplated blind via". The term "unplated blind via" finds basis in paragraph [0040] and [0045], where plating, as described in the application, can "[provide] a **more** robust structure." (See Paragraph [0040], emphasis added). A reasonable interpretation of this statement is that an unplated via is a less robust structure and described in the present

application. Thus, it is apparent that the inventors had possession of the concept of a printed wiring board having an unplated blind via filled with a conductive material. (See MPEP 706.03cc).

As the Examiner is aware, under MPEP §2131, a claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. Furthermore, the identical invention must be shown in as complete detail as is contained in the claim.

The Office Action states that the Mizumoto reference discloses all of the claim limitations of the present application and is only silent regarding the thickness of the first conductive layer.

The Mizumoto reference specifically teaches a "plated layer 330 made of conductive material [provided] on a first via hole formed in the first insulating layer 310 on the substrate 300, the first via hole 340 being filled with metal, metal paste or the like electrically conductive material." (See Column 4, lines 37-40, and Figure 12). The formation of the conductive path is described as, "point A: filler material 350; plated layer 360; filler material 340; plated layer 300; and point B." Thus, the Mizumoto reference does not provide for "an unplated blind via having a sidewall" as recited in claims 46, 50, and 53. Further, Mizumoto does not disclose "a

cured mass of a flowable conductive material extending over the sidewall and filling said unplated blind via” as recited in claim 46.

In view of the foregoing, it is Applicants’ position that the Mizumoto reference does not anticipate independent claims 46, 50, and 53, and thus each of the claims that depend therefrom. Reconsideration and withdrawal of the rejection under 35 U.S.C. 102(b) of claims 46-62 is respectfully requested.

Claim Rejections – 35 USC § 103(a) - Mizumoto

In the Office Action dated April 4, 2004, claims 46-62 were rejected under 35 U.S.C. 102(b) as rendered obvious by Mizumoto (U.S. Patent No. 5,662,987). As previously discussed, independent claims 46, 50, and 53 are amended to better define Applicants’ inventive concepts. For the reasons set forth below, it is Applicants’ position that the Mizumoto reference does not render obvious independent claims 46, 50, and 53 as amended and thus, each of the claims that depend therefrom.

As the Examiner is aware, to establish a prima facie case of obviousness, all of the claim limitations must be taught or suggested by the prior art. See MPEP §2143.03. Additionally, the prior art must suggest the desirability of the claimed invention. See MPEP §2143.01.

The Mizumoto reference does not provide for "an unplated blind via" as recited in claims 46, 50, and 53, nor does the Mizumoto reference inherently infer that "an unplated blind via" would be used. The Mizumoto reference discloses that "a critical teaching of the present invention is that filling and smoothing a formed via hole enables another via hole to be formed directly thereabove" and that "the filler may not necessarily be of the same conductive material"...and "even a non-conducting insulative resin material can meet the objects of the present invention." (See Column 5, lines 8-17). In order to provide for the conductive path between points A and points B using the non-conducting insulative resin, the Mizumoto reference describes that the connection would follow, "point A; plated layer 360, conductive layer 390, plated layer 330; point B". (See Column 5, lines 28-29). Even with a conductive material as the filler, the connection follows, "point A; filler material; plated layer; filler material; plated layer; and point B". (See column 5, lines 7-8). As such, every embodiment within the Mizumoto reference uses a plated layer. Thus, the Mizumoto reference does not suggest the desirability of the claimed limitation of "an unplated blind via" as recited in claims 46, 50, and 53.

In view of the foregoing, it is Applicants' position that the Mizumoto reference does not render obvious the claimed invention of independent

claims 46, 50, and 53, and thus each of the claims that depend therefrom. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) and of claims 46-62 is respectfully requested.

Claim Rejections – 35 USC § 102(b) - ISHIKAWA

In the Office Action dated April 4, 2004, claims 46-62 were rejected under 35 U.S.C. 102(b) as anticipated by Ishikawa (U.S. Patent No. 5,243,142). Independent claims 46, 50, and 53 have been amended to better define Applicants' inventive concepts. As previously discussed, claims 46, 50, and 53 were each amended to specifically characterize the "blind via" as "an unplated blind via". For the reasons set forth below, it is Applicants' position that the Ishikawa reference does not anticipate independent claims 46, 50, and 53 as amended and thus, each of the claims that depend therefrom.

As the Examiner is aware, under MPEP §2131, a claim is anticipated only if each and every element as set forth in the claim is found in a single prior art reference. Furthermore, the identical invention must be shown in as complete detail as is contained in the claim.

The Ishikawa reference discloses, "a double-sided copper clad insulating substrate having through holes at desired portions" wherein "an

electroconductive plating layer" is formed on the inner walls of the through holes. (See column 2, lines 30-33). The electroconductive plating layer on the inner walls of the through holes does not provide for "an unplated blind via" as recited in claims 46, 50, and 53.

In view of the foregoing, it is Applicants' position that the Ishikawa reference does not anticipate independent claims 46, 50, and 53 and thus each of the claims that depend therefrom. Reconsideration and withdrawal of the rejection under 35 U.S.C. 102(b) of claims 46-62 is respectfully requested.

Claim Rejections – 35 USC § 103(a) - Ishikawa

In the Office Action dated April 4, 2004, claims 46-62 were rejected under 35 U.S.C. 102(b) as rendered obvious by Ishikawa (U.S. Patent No. 5,243,142). As previously discussed, independent claims 46, 50, and 53 are amended to better define Applicants' inventive concepts. For the reasons set forth below, it is Applicants' position that the Ishikawa reference does not render obvious independent claims 46, 50, and 53 as amended and thus, each of the claims that depend therefrom.

As the Examiner is aware, to establish a prima facie case of obviousness, all of the claim limitations must be taught or suggested by the

prior art. See MPEP §2143.03. Additionally, the proposed modification cannot render the prior art unsatisfactory for its intended purpose. See MPEP §2143.01.

The Ishikawa reference does not provide for "an unplated blind" as recited in claims 46, 50, and 53, nor does the Ishikawa reference inherently infer that "an unplated blind" would be used. Specifically, Ishikawa teaches the "inner portions of through holes are filled with a non-electroconductive resin paste containing a metal powder" and further states "the content of the metal powder in the resin paste is preferably in the range of not showing electroconductivity." (See column 2, lines 60-62 and column 3, lines 4-6). The Examiner states that this is but a mere design choice, however, the Ishikawa reference specifically uses the non-electroconductivity characteristic in the design as seen in the statement, "...but, even if bubbles are generated in the filled resin paste to form voids, no undesirable bad influence due to the formation of voids appears due to showing non-electroconductivity of the cured resin paste containing a metal powder". (See column 3, lines 47-51). An "unplated blind via" combined with a non-electroconductive paste would not provide for the function of electroconnecting wiring layers as proposed by the Ishikawa reference.

Thus, "an unplated via" as recited in claims 46, 50, and 53 would render the Ishikawa unsatisfactory for its intended purpose.

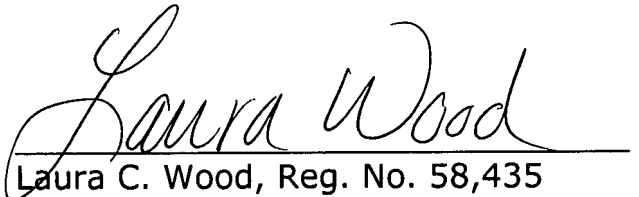
In view of the foregoing, it is Applicants' position that the Ishikawa reference does not render obvious independent claims 46, 50, and 53, and thus each of the claims that depend therefrom. Reconsideration and withdrawal of the rejection under 35 U.S.C. 103(a) of claims 46-62 is respectfully requested.

Conclusion

It is respectfully submitted that this application, as now amended, is in condition for allowance for the reasons stated above. Therefore, it is requested that the Examiner reconsider each and every rejection as applicable to the claims now pending in the application and pass such claims to issue.

This amendment is intended to be a complete response to the Office Action dated April 4, 2007. In the event that any outstanding issues remain that would delay the allowance of this application, the examiner is urged to contact the undersigned to **telephonically** discuss such outstanding issues.

Respectfully submitted,

A handwritten signature in cursive script that reads "Laura Wood". The signature is written in black ink and is positioned above a horizontal line.

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Sheet 2 of 3
Annotated Sheet

Application No. : 10/632,576 Confirmation No.: 5022
Applicant(s) : John LeRoy Parker and Pamela L. Miscikowski
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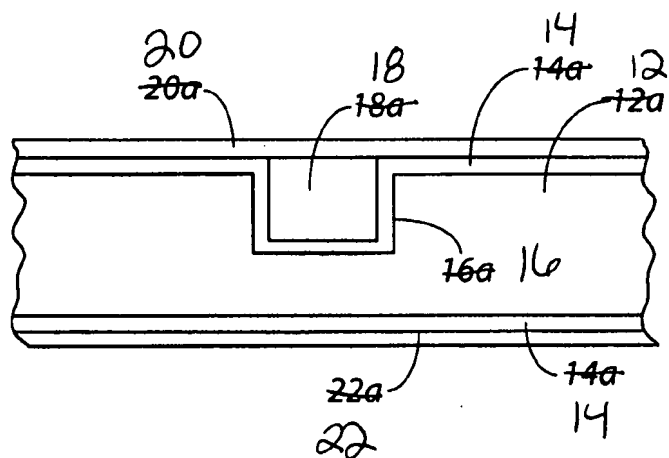


FIG. 3